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1 [Level set and PDE methods for computer graphics](#)



David Breen, Ron Fedkiw, Ken Museth, Stanley Osher, Guillermo Sapiro, Ross Whitaker

 August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04**

Publisher: ACM Press

 Full text available: pdf(17.07 MB) Additional Information: [full citation](#), [abstract](#)

Level set methods, an important class of partial differential equation (PDE) methods, define dynamic surfaces implicitly as the level set (iso-surface) of a sampled, evolving nD function. The course begins with preparatory material that introduces the concept of using partial differential equations to solve problems in computer graphics, geometric modeling and computer vision. This will include the structure and behavior of several different types of differential equations, e.g. the level set eq ...

2 [Real-time shading](#)



Marc Olano, Kurt Akeley, John C. Hart, Wolfgang Heidrich, Michael McCool, Jason L. Mitchell, Randi Rost

 August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04**

Publisher: ACM Press

 Full text available: pdf(7.39 MB) Additional Information: [full citation](#), [abstract](#)

Real-time procedural shading was once seen as a distant dream. When the first version of this course was offered four years ago, real-time shading was possible, but only with one-of-a-kind hardware or by combining the effects of tens to hundreds of rendering passes. Today, almost every new computer comes with graphics hardware capable of interactively executing shaders of thousands to tens of thousands of instructions. This course has been redesigned to address today's real-time shading capabili ...

3 [High dynamic range imaging](#)



Paul Debevec, Erik Reinhard, Greg Ward, Sumanta Pattanaik

 August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04**

Publisher: ACM Press

 Full text available: pdf(20.22 MB) Additional Information: [full citation](#), [abstract](#)

Current display devices can display only a limited range of contrast and colors, which is one of the main reasons that most image acquisition, processing, and display techniques

use no more than eight bits per color channel. This course outlines recent advances in high-dynamic-range imaging, from capture to display, that remove this restriction, thereby enabling images to represent the color gamut and dynamic range of the original scene rather than the limited subspace imposed by current monitor ...

4 The elements of nature: interactive and realistic techniques



Oliver Deussen, David S. Ebert, Ron Fedkiw, F. Kenton Musgrave, Przemyslaw Prusinkiewicz, Doug Roble, Jos Stam, Jerry Tessendorf
August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04**

Publisher: ACM Press

Full text available: pdf(17.65 MB) Additional Information: [full citation](#), [abstract](#)

This updated course on simulating natural phenomena will cover the latest research and production techniques for simulating most of the elements of nature. The presenters will provide movie production, interactive simulation, and research perspectives on the difficult task of photorealistic modeling, rendering, and animation of natural phenomena. The course offers a nice balance of the latest interactive graphics hardware-based simulation techniques and the latest physics-based simulation techni ...

5 Collision detection and proximity queries



Sunil Hadap, Dave Eberle, Pascal Volino, Ming C. Lin, Stephane Redon, Christer Ericson
August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04**

Publisher: ACM Press

Full text available: pdf(11.22 MB) Additional Information: [full citation](#), [abstract](#)

This course will primarily cover widely accepted and proved methodologies in collision detection. In addition more advanced or recent topics such as continuous collision detection, ADFs, and using graphics hardware will be introduced. When appropriate the methods discussed will be tied to familiar applications such as rigid body and cloth simulation, and will be compared. The course is a good overview for those developing applications in physically based modeling, VR, haptics, and robotics.

6 Fast detection of communication patterns in distributed executions

Thomas Kunz, Michiel F. H. Seuren

November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**

Publisher: IBM Press

Full text available: pdf(4.21 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Understanding distributed applications is a tedious and difficult task. Visualizations based on process-time diagrams are often used to obtain a better understanding of the execution of the application. The visualization tool we use is Poet, an event tracer developed at the University of Waterloo. However, these diagrams are often very complex and do not provide the user with the desired overview of the application. In our experience, such tools display repeated occurrences of non-trivial commun ...

7 ProbView: a flexible probabilistic database system



Laks V. S. Lakshmanan, Nicola Leone, Robert Ross, V. S. Subrahmanian
September 1997 **ACM Transactions on Database Systems (TODS)**, Volume 22 Issue 3

Publisher: ACM Press

Full text available: pdf(1.92 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citings](#), [index terms](#)

Probability theory is mathematically the best understood paradigm for modeling and manipulating uncertain information. Probabilities of complex events can be computed from

those of basic events on which they depend, using any of a number of strategies. Which strategy is appropriate depends very much on the known interdependencies among the events involved. Previous work on probabilistic databases has assumed a fixed and restrictive combination strategy (e ...

Keywords: probabilistic databases, view maintenance

8 Combinatorial techniques for mixed-size placement



S. N. Adya, I. L. Markov

January 2005 **ACM Transactions on Design Automation of Electronic Systems (TODAES)**, Volume 10 Issue 1

Publisher: ACM Press

Full text available: pdf(1.80 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

While recent literature on circuit layout addresses large-scale standard-cell placement, the authors typically assume that all macros are fixed. Floorplanning techniques are very good at handling macros, but do not scale to hundreds of thousands of placeable objects. Therefore we combine floorplanning techniques with placement techniques to solve the more general placement problem. Our work shows how to place macros consistently with large numbers of small standard cells. Proposed techniques can ...

Keywords: VLSI, floorplanning, placement

9 Pen-based interaction techniques for organizing material on an electronic whiteboard



Thomas P. Moran, Patrick Chiu, William van Melle

October 1997 **Proceedings of the 10th annual ACM symposium on User interface software and technology**

Publisher: ACM Press

Full text available: pdf(1.34 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: emergent structure, freeform interaction, gestural interfaces, implicit structure, informal systems, list structures, meeting support tools, pen-based systems, recognition-based systems, structural grouping, user interface design, whiteboard metaphor

10 Automatic temporal layout mechanisms revisited



M. Cecelia Buchanan, Polle T. Zellweger

February 2005 **ACM Transactions on Multimedia Computing, Communications, and Applications (TOMCCAP)**, Volume 1 Issue 1

Publisher: ACM Press

Full text available: pdf(1.09 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

A traditional static document has a spatial layout that specifies where objects in the document appear. Because multimedia documents incorporate time, they also require a temporal layout, or schedule, that specifies when events in the document occur. This article argues that multimedia document systems should provide mechanisms for automatically producing temporal layouts for documents. The major advantage of this approach is that it makes it easier for authors to create and modify multimedia documents ...

Keywords: Multimedia documents, multimedia authoring, temporal formatting, temporal specification

11 Interacting with large surfaces: Keepin' it real: pushing the desktop metaphor with physics, piles and the pen



Anand Agarawala, Ravin Balakrishnan

April 2006 **Proceedings of the SIGCHI conference on Human Factors in computing systems CHI '06**

Publisher: ACM Press

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We explore making virtual desktops behave in a more physically realistic manner by adding physics simulation and using piling instead of filing as the fundamental organizational structure. Objects can be casually dragged and tossed around, influenced by physical characteristics such as friction and mass, much like we would manipulate lightweight objects in the real world. We present a prototype, called BumpTop, that coherently integrates a variety of interaction and visualization techniques opti ...

Keywords: Lasso'n'Cross, LassoMenu, bumptop, crumple, desktop metaphor, fanout, pen-based interfaces, physical interaction, physics based desktop, pile widgets, piles, piling metaphor

12 Query evaluation techniques for large databases



Goetz Graefe

June 1993 **ACM Computing Surveys (CSUR)**, Volume 25 Issue 2

Publisher: ACM Press

Full text available: [pdf\(9.37 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Database management systems will continue to manage large data volumes. Thus, efficient algorithms for accessing and manipulating large sets and sequences will be required to provide acceptable performance. The advent of object-oriented and extensible database systems will not solve this problem. On the contrary, modern data models exacerbate the problem: In order to manipulate large sets of complex objects as efficiently as today's database systems manipulate simple records, query-processi ...

Keywords: complex query evaluation plans, dynamic query evaluation plans, extensible database systems, iterators, object-oriented database systems, operator model of parallelization, parallel algorithms, relational database systems, set-matching algorithms, sort-hash duality

13 Head-Driven Statistical Models for Natural Language Parsing

Michael Collins

December 2003 **Computational Linguistics**, Volume 29 Issue 4


Publisher: MIT Press

Full text available: [pdf\(633.30 KB\)](#) Additional Information: [full citation](#), [abstract](#)

This article describes three statistical models for natural language parsing. The models extend methods from probabilistic context-free grammars to lexicalized grammars, leading to approaches in which a parse tree is represented as the sequence of decisions corresponding to a head-centered, top-down derivation of the tree. Independence assumptions then lead to parameters that encode the X-bar schema, subcategorization, ordering of complements, placement of adjuncts, bigram lexical dependencies, ...

14

Large models & large displays: Cache-oblivious mesh layouts

-  Sung-Eui Yoon, Peter Lindstrom, Valerio Pascucci, Dinesh Manocha
July 2005 **ACM Transactions on Graphics (TOG)**, Volume 24 Issue 3

Publisher: ACM Press

Full text available:  [pdf\(447.02 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present a novel method for computing cache-oblivious layouts of large meshes that improve the performance of interactive visualization and geometric processing algorithms. Given that the mesh is accessed in a reasonably coherent manner, we assume no particular data access patterns or cache parameters of the memory hierarchy involved in the computation. Furthermore, our formulation extends directly to computing layouts of multi-resolution and bounding volume hierarchies of large meshes. We deve ...

15 Embedding robots into the Internet

-  Gaurav S. Sukhatme, Maja J. Mataric
May 2000 **Communications of the ACM**, Volume 43 Issue 5

Publisher: ACM Press

Full text available:  [pdf\(376.70 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#),
 [html\(35.64 KB\)](#) [review](#)

16 Resource scheduling for parallel database and scientific applications

-  Soumen Chakrabarti, S. Muthukrishnan
June 1996 **Proceedings of the eighth annual ACM symposium on Parallel algorithms and architectures**

Publisher: ACM Press

Full text available:  [pdf\(984.42 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

17 Object-based and image-based object representations

-  Hanan Samet
June 2004 **ACM Computing Surveys (CSUR)**, Volume 36 Issue 2

Publisher: ACM Press

Full text available:  [pdf\(1.05 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

An overview is presented of object-based and image-based representations of objects by their interiors. The representations are distinguished by the manner in which they can be used to answer two fundamental queries in database applications: (1) Feature query: given an object, determine its constituent cells (i.e., their locations in space). (2) Location query: given a cell (i.e., a location in space), determine the identity of the object (or objects) of which it is a member as well as the re ...

Keywords: Access methods, R-trees, feature query, geographic information systems (GIS), image space, location query, object space, octrees, pyramids, quadrees, space-filling curves, spatial databases

18 Waiting time analysis and performance visualization in Carnival

-  Wagner Meira, Thomas J. LeBlanc, Alexandros Poulos
January 1996 **Proceedings of the SIGMETRICS symposium on Parallel and distributed tools**

Publisher: ACM Press

Full text available:  [pdf\(1.68 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

19 GPGPU: general purpose computation on graphics hardware

David Luebke, Mark Harris, Jens Krüger, Tim Purcell, Naga Govindaraju, Ian Buck, Cliff Woolley, Aaron Lefohn

August 2004 **Proceedings of the conference on SIGGRAPH 2004 course notes GRAPH '04****Publisher:** ACM PressFull text available: pdf(63.03 MB) Additional Information: [full citation](#), [abstract](#)

The graphics processor (GPU) on today's commodity video cards has evolved into an extremely powerful and flexible processor. The latest graphics architectures provide tremendous memory bandwidth and computational horsepower, with fully programmable vertex and pixel processing units that support vector operations up to full IEEE floating point precision. High level languages have emerged for graphics hardware, making this computational power accessible. Architecturally, GPUs are highly parallel s ...

20 Support vector machine active learning with applications to text classification

Simon Tong, Daphne Koller

March 2002 **The Journal of Machine Learning Research**, Volume 2**Publisher:** MIT PressFull text available: pdf(331.94 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Support vector machines have met with significant success in numerous real-world learning tasks. However, like most machine learning algorithms, they are generally applied using a randomly selected training set classified in advance. In many settings, we also have the option of using *pool-based active learning*. Instead of using a randomly selected training set, the learner has access to a pool of unlabeled instances and can request the labels for some number of them. We intr ...

Keywords: active learning, classification, relevance feedback, selective sampling, support vector machines

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